UNITED STATES DEPARTMENT OF AGRICULTURE

FOREST SERVICE

BRANCH OF RESEARCH

MONTHLY REPORT

OF

DENDROLOGY

FOREST EXPERIMENT STATIONS

FOREST PRODUCTS

FOREST ECONOMICS

GRAZING RESEARCH

February, 1927.

GOVERNMENT PRINTING OFFICE 911037

BRANCH OF RESEARCH

February, 1927

CONTENTS

Reports Not Received:

Southwestern Forest Experiment Station
Forest Products - Washington Office
Forest Economics
Forest Taxation Inquiry
Grazing Research - Great Basin
Research Editor

FOREWORD

WHAT IS RESEARCH? (Continued from January Report)

A definite, restricted problem having been selected, a theory or hypothesis is essential in organizing the plan of attack, as a starting point and as a guide in the further conduct of the investigation. Quite often one is warned of the danger of a preconceived idea. It is, however, not unscientific to have a quite definite preconceived notion, provided it is not allowed to control and bias the investigator. On the contrary, research implies a hypothesis, for there is an old adage that "Without hypothesis, no science."

The hypothesis has a necessary role that no one has ever contested, only it ought always as soon as possible and as often as possible be subjected to verification. And, of course, if it does not stand this test, it ought to be abandoned without reserve. The danger of hypotheses lies in making them unconsciously or without a proper foundation, and in accepting them as truth and in clinging to them in spite of contrary evidence. We all dislike to see our brain child thrown overboard. This danger is far greater in the biological sciences which enter into forest investigations than in those having the precision of mathematics and capable of detailed proof. However, the discarded hypothesis is not entirely barren, for, while it has given a negative result, it has led to the opportunity for further discovery. Without the hypothesis the experiment would have been mere chance, and hence would have been lost because of the inability of the observer to see anything extraordinary in it. But essential and helpful as the hypothesis experiment is, in the subject with which forest research deals it is a source of truth. It alone can teach us anything new; it alone can give us certainty.

Success in silvical research depends not alone on skill and ingenuity in planning experiments, but on foresight in generalizing from the many facts obtained. The silviculturist must be able to look beyond what the bare facts demonstrate and to derive suggestions from them. A good experiment has been defined as one which "informs us of something besides an isolated fact, which enables us to foresee things through generalization."

Aside from its own intrinsic value, each demonstrated fact enables the investigator to see other apparent facts, the essential features of which must be verified by experiment at the first opportunity, but which in the meantime enable further foresight, although without absolute certainty. As experiments are time-consuming, knowledge can never be fully supported on verified experiments, hence it is necessary to get the utmost possible number of predictions from every experiment, and with the highest possible degree of probability.

Knowledge is not a gift of bare experience nor even made solely out of experience. The creative activity of the mind is an important essential in its derivation. We report facts and we say we let them speak for themselves. But as we investigate we inevitably interpret the results as well

as record them. Research leads outside the field of human experience and beyond experiment, and through constructive reasoning extends the boundaries of knowledge.

All of these things point to the necessity for adequate reflection in productive research. The experiment is only a means to an end; the fact in and of itself may be barren if merely observed and chronicled. It is the skill and foresight of the investigator in deriving his facts and the use which he is capable of making of these facts in seeing relations which are not obvious to the casual observer, supporting and developing his hypothesis and guiding his further experiments, that determine his research ability. The unreasoning making of experiments or the blind establishment of sample plots bears no stamp of originality, leads nowhere except by the sheerest chance, and is not in itself of the nature of research. It is what the scientist puts into the contemplation of the facts, the point of view they give him, and the further plans they suggest to his mind that make them really virile.

This means that the investigator must be a student as well as an experimenter, must study his results critically to determine their true significance and relationships, and interpret them in their bearing on his hypothesis. Unless he can take the time for reflection he will often miss the significant points in his work, will not be guided by what has gone before, and his investigation will develop and devolve largely into a round of routine.

Research advances by a procession of experiments and observations, based on hypothesis and guided by the foresight which generalization supplies. Science prospers through empirical discoveries, and the theory must not run counter to any positive empirical fact. But science does not stop with their determination; it demands the reason, the connection, the law. These are derived through induction from facts developed experimentally which support the theory, or the principle, or the conclusion at a central point. Without these steps research lacks the essential features.

But research is not the whole sole source of our knowledge and there are many additions to knowledge of a sound, scientific character whose derivations do not seem to answer the definition of research. Among such are discoveries made perhaps by chance observation, or the recognition of a fact in an experiment whose purpose might be wholly one of training or administration rather than of research, or possibly in the course of actual research but not as an outgrowth of it. These may all have the weight of scientific facts, constitute contributions to our forest science, be strictly original, but still not represent research. This makes them, however, no less valuable or dignified.

Research carries with it the idea of a protracted inquiry; a conscious, premeditated effort in the working out of problems usually not solved by a single experiment, but requiring progressive study through a series of experiments from which the answer is gradually evolved. If we are to accept the definition of the scientists, forest research is to be understood as an excursion into the unknown realms of tree growth, involving a combination of various types of effort - hypothesis, experiment, generalization.

It will be recognized that in contrast to research, what we commonly designate as "experiments" are much simpler in their aim and plan, and lack the finality of research. They are usually satisfied with an empirical result. They may not even be original as they may be for verification alone, and many experiments aim merely to test out or to adapt the conclusions from former work to a new locality, new species, or a new set of conditions. They may not even be scientific in the sense that they succeed quickly in the determination of the fact, but they should be made with all the care and precision at our command. In this category would fall many of our empirical and administrative experiments to determine methods of practice or relative value. Usually the results are of a more or less temporary nature, and often serve as demonstrations as well as experiments.

A large share of the ordinary sample plot or field experiments are comparative tests rather than strictly scientific investigations. They are made presumably under quite uniform conditions, and hence the results of the comparisons in a given series of plots or experiments are fairly comparable one with another, but perhaps not directly comparable with those in other regions or in other lines of work where the combinations must necessarily be different. They report the findings under a given set of conditions which may not occur again in another period or in another locality. Most of them are influenced by factors beyond our control and which it is impossible for us to take fully into account, because we do not know their nature or ultimate influence. The conditions of the field experiment differ naturally from the controlled conditions possible in the laboratory.

The aim of many experiments is to get a relatively quick result without resorting to the provision and detail of thoroughgoing investigation. In many cases this meets the immediate need of the problem and of practice. To know that burning the litter, for example, better prepares the ground for a particular tree crop is quite sufficient, but to determine just why this is true would involve a more intricate series of investigations than we may be able at present to carry out, since many factors of soil, moisture, biology, and chemical and physical changes must be taken into account. On the other hand, some silvicultural experiments are of such a kind or have so often been repeated and checked under varying conditions that quite broad generalizations may be drawn from them.

Taken as a whole, this form of inquiry has been of inestimable value and service to American forestry, since through it there have been developed practical methods which are making forestry a profitable undertaking. There is need for still more work of this character, and for many years to come it will properly constitute a large share of Forest Experiment Station effort.

But, like other research, it should be progressive, recognizing that advancement depends upon building on the things that have become known. After a certain number of experiments on a given topic have been made it may be well to consider whether it is worth while to continue them. In certain classes of our work an endless number of different combinations may be made, and many of these may give no new results of immediate value. The experimenter should be careful not to extend such work beyond what is actually needed. Even at the present stage we can regard some certain facts as already established, in so far as it is possible to establish them by the methods employed, and direct our effort to other lines of inquiry rather than move in circles. The methods also should be progressive in order that questions may be dealt with in a way to give them a more enduring and intelligent answer, and finally, those experiments whose limitations are recognized will often suggest subjects for more systematic and careful research. For we need a broader foundation of definite forestry knowledge, and the methods of the ordinary isolated experiment cannot alone furnish the foundation for a well-rounded theory and science of American forestry.

The line which separates the ordinary sample plot experiment from a demonstration trial is a changing one. What is an experiment in a new field this year may be a subject for demonstration trials the next or in the year to come, and with the continued extension of demonstration agencies there should be a close scrutiny of the experiments, perhaps with the result of their possible elimination. Experimental work and demonstration work really require separate fields. In theory at least, they should not overlap and the desire of the station to test out locally the results of experimental findings should not lead into a series of purely demonstration trials, such as cuttings on an Experimental Forest without regard to the experimental side or research value.

The field experimenter is justified in repeating his experiment upon different types of soil or under different climatic conditions sufficiently to test the validity of his deductions in various parts of his forest region; but it is useless for him to attempt detailed and very exact experiments on many areas in the same general forest type when the probability is that the essential features of the experiment may be covered in a more limited number of trials. Indeed it may well be questioned whether he is within his field as a station worker in doing so. One effect of the outlying work, where carefully done, is to emphasize the distinction between an experiment made to obtain information and a demonstration designed to impart it. The experiment to be of general value must be made under controlled conditions, and not the subject to the convenience or judgment of the administrative officer or forest owner, who rarely understands the necessity for method and precision. Field experiments which are not thoroughly supervised and controlled by trained men usually have little experimental value, and hence to do careful work makes necessary the absolute control of the land and the direction of the work a condition of the experiment. This is usually not required or thought even desirable in the

case of demonstration trials, which indicates a distinct difference in the character of the two lines of work. This might reasonably mark a boundary line between them. For this reason, the "experimental forest" is a "demonstration forest" only as it shows the results obtained through real experiment or research.

-------#-------

DENDROLOGY

Hardy Eucalypts

Several years ago Mr. H. D. Tiemann brought back from New South Wales and Victoria, Australia, a small quantity of the seed of the Snow Gum (Eucalyptus coriacea alpina). Some of this seed was planted in Washington, under greenhouse conditions, and in the spring the young plants were put out of doors for the summer. Seed of this gum was also planted at the Appalachian Experiment Station.

In the meantime, Mr. G. Weindorfer of Cradle Mountain, Tasmania, sent to the Forest Service for trial a small quantity of the seed of the Stringy Bark (Eucalyptus obliqua), said to be specially resistant to cold. This seed also was tried out at the Appalachian Experiment Station where the young plants were frozen to the ground, as were also plants raised there of Eucalyptus coriacea alpina. Seed of Eucalyptus obliqua was also tried by Prof. T. J. Starker in the vicinity of the Oregon State Agricultural College at Corvallis.

Prof. Starker now writes that he succeeded in raising one plant of Eucalyptus obliqua and that it has survived two winters in the open. The tree, now two years old, has attained a height of eight feet and a diameter at the collar of 1-3/4 inches, and is in a very vigorous condition. The winter of 1926-1927 at Corvallis subjected this plant to a temperature of 8 degrees (Fahr.) above zero, the only visible damage done being the loss of a few leaves. Prof. Starker believes this injury was due to high cold winds, rather than to low temperature.

Prof. Starker also reports that the Snow Gum seedling sent to him from Washington two years ago is growing thriftily out of doors, but that it is not as handsome as the Stringy Bark Gum.

It is altogether gratifying that Eucalyptus obliqua should survive the winter climate of northwestern Oregon. Elsewhere it is successfully grown farther south in California, in southwestern Arizona, and in southern Florida. It was rather to be expected that the Snow Gum, growing in its native snow-clad mountains at elevations of from 4,000 to 6,000 feet, would survive in western Oregon. It is, of course, too soon in this small experiment to assume that these two gums can be depended upon to permanently succeed in western Oregon. The outlook, however, is encouraging.

Range Maps for the Experiment Stations

Progress is being made in supplying the Experiment Stations with maps showing the range of commercially important trees found within each Station's territory. Maps showing the range of 19 trees were recently sent to the Northeastern Station, and similarly maps for 13 species went to the Great Lakes Station. Within a few days the Northeastern States will receive maps for 18 more trees, and the Lake States will receive maps for 12 species; while the Appalachian will receive maps for 69 trees, and the Southern Station will receive maps for 70 different trees of its territory.

FOREST EXPERIMENT STATIONS

Washington

General

The meeting of the Northeastern Forest Research Council was held at Springfield, Mass., on February 3, and was attended by Munns.

Following the meeting of the Pulp and Paper Association in New York, Zon and Frothingham visited Washington. With these men present and also Bates, Demmon, and Haig, the office was considerably crowded. It is seldom that so many stations have been represented in Washington at one time.

Legislation

Probably the most interesting of all the bills introduced in Congress as far as Forest Research is concerned, is the one introduced toward the close of the session by Representative McSweeney of Ohio, of the organic act for forest research. The McSweeney bill follows in general the suggestions made by the Committee of the Society of American Foresters which appeared in the book "A National Program of Forest Research." It is understood that the bill introduced by McSweeney was sponsored by the National Forest Program Committee. As Congress adjourned before taking any action upon the bill, it will have to be reintroduced in the next session of Congress.

Another Congress passed out of existence on March 4 without taking any action on the bills for the tropical experiment station or for the Northern Rocky Mountain work. Toward the close of the session there was a legislative jam in which many meritorious bills were caught. One of these provided for an arboretum in Washington which was slated for approval. Funds for the purchase of the land involved ($300,000) were carried in the deficiency bill which failed of passage. Similarly, also, funds for insect control work in Colorado were lost.

A New Examination

An examination for the various positions in the silviculturist grades is being requested of the Civil Service Commission. The closing date of the examination will be seom time in May. It is hoped that this register will result in a list of eligibles sufficient to last for several years. This probably will be the last of the examinations of this character, since it is hoped that expansions in the experiment station force will come about through assignments of junior foresters or by transfers from the administrative organization. Vacancies to be filled from this examination will be in the Allegheny and the Ohio-Mississippi Valley Stations, the name Allegheny being finally adopted for the Middle Atlantic States Station.

Pack Prizes

Although the Pack prize did not fall to the lot of anyone in the Branch of Research, it is interesting to know that Research bulked large in the competition. Eight of the 25 papers submitted came from members of the Research organization, two receiving honorable mention. Whether the committee recommended the publication of all the papers submitted in the test is unknown, but it is known that in the committee's opinion all those submitted by the Branch of Research are worthy of publication. This showing on the part of the men in Research is in large measure a tribute to their ability to think and write clearly and forcibly and to their interest in the important problems affecting forestry in this country just now. That silvical men are keeping in touch with the development of forestry is indicated by the fact that 7 of the 8 are members of the forest experiment stations.

Mensuration

Haig continued work on the growth and yield study of the white pine and is making notable progress. Practically the entire force in the Section of Forest Measurements has been turned over to him and he has been turning out a volume table a day. This study is proving more of a task than originally expected. A whole new series of volume tables for the five associated species had to be prepared before the yields of mixed stands could be determined. Although the work and methods are much the same as in the previous yield studies, this one is introducing difficulties due to mixed species and has become almost as formidable a task as the initial yield study in the southern pines.

In the tabulating section a considerable amount of time has been devoted to the completion of the Northeastern fire studies.

Library

Last month 966 books and periodicals were borrowed from the library, and 115 members of the Service and others consulted the library in person.

There were 180 articles, books and pamphlets indexed for the catalogue during the month.

-------#-------

NORTHEASTERN FOREST EXPERIMENT STATION

The winter meeting of the Northeastern Forest Research Council was held at Springfield, Mass., on February 3. There was an exceptionally full attendance with eleven out of the fifteen members present. The meeting was also attended by Munns as a representative of the Washington office, Behre from the Northeastern Forest Experiment Station, Galarneau, assistant forester for the Massachusetts Conservation Commission, and Campbell, manager of the Hampden County Improvement League. Two changes in the council have recently been made: E. H. Thomson, president of the Federal

Land Bank for the Northeastern District, having been named in place of S. H. Keith; and Blaine S. Viles, timberland owner of Augusta, Maine, in place of F. H. Colby. Mr. Thomson attended the meeting, but no reply to the Secretary's invitation has yet been received from Mr. Viles. The resignation of H. G. Philbrook, who has recently moved to Florida, leaves a vacancy that has not yet been filled.

The meeting of the council was devoted largely to consideration of progress made by the Experiment Station during the past year on its major projects, and plans for the coming season. The council urged particularly that the chief results so far obtained from the studies under way be made available in the form of short articles prior to their publication by the Department in bulletin form. The council also recommended publication by the Station of a list of all permanent sample plots so far established in the region, with information as to their location and purpose; and urged cooperation with the Station by other agencies in the establishment of many additional permanent sample plots. Sentiment was unanimous that there are many problems, such as the determination of what has happened on cut-over areas and of the development of both normal and abnormal stands which can be studied satisfactorily only in this way.

The council affirmed its decision of last summer to correspond with other forest research councils in regard to an organic act for forest research, and suggested that the Station attempt to meet in part the difficulties caused by its present small allotment by obtaining cooperative funds for specific projects in which it might be possible to enlist financial support of individuals or organizations. In this connection Mr. Foster called attention to the fact that an endowment available on the death of the donor has been made which will eventually make available approximately $10,000 per year for forest research by the New Hampshire Department of Forestry. Mr. Thomson spoke very interestingly on the activities of the Federal Land Bank in promoting forestry through loans on timberland and on the necessity of showing farmers how they can market their timber profitably. Mr. Kendall also emphasized the marketing end of the problem. After some discussion it was voted to bring to the attention of the various State foresters the importance of preparing and maintaining up-to-date lists of the wood-using industries in their respective States.

The members of the Station greatly enjoyed and profited from a brief visit by Munns immediately following the council meeting.

Dana attended the winter meeting of the New York Section of the Society of American Foresters on February 2, at Albany, where he gave an account of the World Forestry Congress at Rome last spring. He also spoke on "Growing Spruce for Pulpwood in the Northeast" at the annual meeting of the Woodlands Section of the American Paper and Pulp Association in New York on February 23. At the Albany meeting it developed that Governor Smith recently recommended to the legislature action to control cutting by private owners. The usual bill, sponsored by the Association for the Protection of the Adirondacks, providing for diameter limit cutting has also been introduced, but with little prospect of passage. Another bill of interest would authorize an appropriation of one hundred million dollars to be spent in annual installments of not more than five million dollars for the purchase and management of additional State forests in the Adirondacks.

Since New Year's, Spaulding has been putting what are hoped to be the final touches on his long overdue bulletin on white pine blister rust conditions in Europe as seen by him in 1922. Also the data on mixed hardwood and softwood slash decay taken the past season was partially arranged and studied. The most important fungi are determined and considerable done in learning the types of decay caused by each. Another season will be necessary to cover the different conditions and sites thoroughly enough to enable him to draw conclusions at all definitely. At present there are contradictory indications which more complete study of the environmental factors will quite probably explain.

-------#-------

LAKE STATES FOREST EXPERIMENT STATION

The annual investigative report of the Station occupied considerable time and was completed the end of the month, and copies sent to the members of the Advisory Committee and to District 2. Early in the month, opportunity was had to discuss the program, as it relates to the National Forests in this region, with the District Forester, members of the District office and of the National Forests at the Supervisors' Allotment Conference. An understanding was reached as to the work which would be done on the National Forests in the coming year. The members of the District office and of the National Forests are much interested in our projects and in investigative work, both by the Station and by administrative officers, as a means of solving their problems. They make every attempt to cooperate in making the investigative work effective. It developed at the Allotment Conference that District 2, through contributed time to investigative work, incurs a considerably larger item of expense of this character than any other District. It seems that this point has been brought up in connection with the District allotment as an expenditure of questionable justification, and that if they are able to contribute so much time and money to investigative work their allotment may have to be decreased by that amount. It is not a little discouraging to those who are interested in investigative work and attempting to develop cordial cooperation to find that kind of a damper placed on the District's efforts to cooperate.

The final revision of the manuscript, "Timber Growing and Logging Practice in the Lake States," was completed and sent to Washington.

The Minnesota State Rangers and Guards held their annual meeting in St. Paul during the month, and talks were made to them by Mitchell on "The Rating of Fire Hazard," by Wackerman on "Improvement in Swamp Timber Growth by Controlling the Water Levels," and by Kittredge on "Conversion of Aspen and Jack Pine to More Valuable Species." Mitchell also gave a talk to the forest school students on "Analysis of Forest Fire Statistics." Zon led the discussion at a meeting of the Minnesota Section of the Society of American Foresters, at which members of District 2 and the State Rangers were present, and projected forestry into the future with good effect.

Dr. Cowles, head of the Botany Department of the University of Chicago, spent several days at the University, and was entertained one afternoon at the Forest Experiment Station at a meeting of about 40 members of the different divisions concerned with plant science and forestry. Dr. Cowles is much interested in the possibilities in the Forest Service and at the Forest Experiment Stations for work by graduates and graduate students of his department.

Messrs. Garver and Griffee spent three days at the Station in connection with the compilation and checking of the study of Relative Costs of Logging Small and Large Trees. Mr. Hamel, Supervisor of the Superior National Forest, also visited the Station at the end of his speaking tour among the eastern forest schools.

A bill, providing authorization for the raising and distribution of nursery stock by the State of Minnesota, was drawn up by a committee, of which Mitchell was chairman, and through the interest of the Minnesota Conservation Council it has been introduced in the State Legislature.

The Land Economic Survey in Michigan has now completed the work on five rather representative counties in northern Michigan. They give areas by types, size classes, and stocking classes, and their figures offer an opportunity to size up the actual forest situation in Michigan much better than has ever heretofore been possible. Some time has, therefore, been spent by Kittredge in applying the figures for the counties available to groups of counties having similar conditions with the thought that an article might result, giving some new and improved statistics for the forest situation in Michigan.

Zon left the end of the month for New York, where he addressed the annual meeting of the American Paper and Pulp Association on "The Problem of the Pulpwood Supply in the Lake States." He went from there to spend a few days in the Washington office.

In the January report it was stated that board foot volume tables for aspen by both Scribner and International rules have been completed. This should have read "yield" instead of "volume" tables.

---#---

APPALACHIAN FOREST EXPERIMENT STATION

General

Work on reports continued to occupy the staff during February, and there was no active field work. Frothingham prepared an address on "Pulpwood Prospects in the Southern Appalachians" which he gave at the New York meeting of the Woodlands Section, American Paper and Pulp Association. On his return from New York, Frothingham spent two days at the Washington office, discussing the Station's annual report and plans.

Oak Volume Study

Computation of volumes of the white oak group (820 trees) was completed and the tabulated data sent to Washington for punching on cards. Computation of the black oak group is well under way.

The plotting instrument designed by McCarthy earlier in the year for plotting of measurements on plain paper has been improved in form, constructed of metal, and is now suitable for use in the field. It consists of a metal tally board with a spring clamp to hold the paper. Attached to the opposite end of the board is a brass rod upon which a ferrule slides, carrying the diameter scale. The height scale, which is fixed to the board, extends across the end parallel to the brass rod. This arrangement, by which the moving arm carries the diameter scale, makes possible the plotting of both inside and outside bark dimensions at any height without resetting the scale. There still is a need for interchangeable scales to allow plotting of small trees on a larger scale. The instrument should be made for attachment to the regular aluminum tally sheet holders to provide for field use. With this instrument as now designed, 150 to 200 trees can be plotted in a day by two men, and Buell considers this the best means of computing trees which were measured at irregular intervals.

Methods of Cutting Hardwoods

Sims spent most of the month compiling the field data from the 1923, 1924, and 1926 measurements of the sample plots and reproduction quadrats on the Berea College lands at Berea, Ky. The plots were established and marked for cutting in the summer of 1926 and the cutting was completed before the following spring. The speed of reproduction and the large proportion of seedlings of desirable species justify special notice; the following summary is from the records of tagged trees on the reproduction quadrats in plot 1:

Reproduction per acre	1924	1926	
	Number	Number	Per cent
Total	3,254	15,643	100
Timber species	2,769	11,749	75
Dogwood, sassafras, redbud, etc.	485	3,894	25
Timber species, seedling	2,409	9,153	59
" " sprout	360	2,596	17
" " over 4' high	175	3,346	21

In 1926 sugar maple formed 26 per cent, ash 23 per cent, and yellow poplar 10 per cent of the reproduction, as compared with 45, 2, and .5 per cent, respectively, of the original stand over 3½ inches, d.b.h. In 1924 there were 64 advance growth seedlings per acre over 7 feet high. In 1926 there were 815 seedlings and sprouts 7 to 9 feet high, many of them in the 1 and 2 inch d.b.h. classes. Sugar maple is an excellent tree at Berea, and its abundance in the reproduction is gratifying.

If the proposed plans for the continuation of the study of methods of cutting in the hardwood types are adopted, practically the entire staff of the Station will be assigned to this project. Three field parties will make an analysis of areas variously cut-over, while a fourth will establish permanent sample plots in this and related projects. The purpose of the study of cut-over areas is to lead to a thorough-going report on conditions following the different commercial degrees of cutting and is expected to develop directions in which the study may be best carried forward.

-------#-------

SOUTHERN FOREST EXPERIMENT STATION

General

January and February were marked by unusual activity and change. Forbes was in Washington until January 8, and Wyman until January 15, while Demmon left New Orleans for a two-months' detail in Washington on January 20. The headquarters office routine was badly disarranged by work on the pine growth bulletin, and the office itself upset by new furniture, carpenter work, germination tests, seedling measurements, and the annual inventory.

The appointment of Junior Forester Eugene Gemmer to the Florida Forest, with trips to the Florida by Wakeley, Forbes, and Barrett, marked the establishment of the substation on the Choctawhatchee Division.

Mr. Eric Östlin, who is spending a year in this country on a fellowship from the Scandinavian-American Foundation, joined the staff as temporary assistant. He is an experienced forest mensurationist, and has been of the utmost help in bringing his special training and ability to bear on local problems.

While at Bogalusa in January, Wakeley was taken through the new experimental laboratory being built by the Great Southern Lumber Company for paper research. The laboratory is very complete, with digesters, mixers, beaters, a 39-inch combination Fourdrinier-Yankee paper machine, high-ceiling rooms to permit fractionating columns, ample space for testing machines, a concrete-shaft microscope bench, and a constant-humidity chamber. The head chemist, Mr. Stevens, and his two assistants are greatly interested in the possibilities of improving the pulping quality of southern pines by varying the silvicultural treatment.

Pessin continued his work on mycorrhiza, establishing cordial relations at Tulane with Dr. W. T. Penfound, the new head of the Department of Botany. He also prepared a syllabus of forest ecology for the southern States.

Fire Protection

Barrett, despite wet weather, succeeded in burning the winter fire plots at Urania, and made some necessary remeasurements. The Texas fire plot was too damp to burn at the time he visited it, and he had to leave it to the Texas State Forestry Department to burn later. Wakeley burned the winter plot at McNeill.

Measurements

The actual completion of the pine growth bulletin overshadowed all the other work of the Station for the two months. Ostlin's arrival made possible the continuation of a study of growth after cutting. With the help of Barrett, the field work was done at Urania on longleaf trees left after logging. The computations are still in progress at New Orleans and indicate, so far as completed, a remarkably good coincidence of the volumes of trees according to the Swedish form classes with the actual volumes of the trees measured. Furthermore, although the form class appears to be lowered a little, due to the cutting, the accelerated increment is by no means confined, as has sometimes been argued, to the first log-length.

Management

At New Orleans Demmon continued his analysis of extensive surveys, besides working up the results of the site determination and yield comparison study, material for which was obtained at DeQueen, Ark., in December, 1926.

Forbes, Barrett, and Gemmer established several new plots on the Choctawhatchee Division of the Florida National Forest, part in connection with this year's longleaf planting plot and with B. H. Paul's irrigation experiment, and part by themselves, to study seed production and the effects of fire and turpentining on natural regeneration.

Naval Stores

Wyman spent the first half of January in Washington, working on correlation between d.b.h. and number of rings per inch with gum yield of longleaf. On the way back to Starke he spent two days near Wilmington, N. C., with Frothingham and State forestry officials, examining young longleaf suitable for later naval stores investigations.

Raking, burning, raising tins, and hanging cups were completed at Sampson Lake and Kingsley Lake, and a great amount of routine work accomplished on records, computations, and memoranda.

Forestation

Wakeley completed the measurements of stock from the 1925-26 nursery, taking numerous photographs and miscellaneous notes. He also collected a number of seedlings of various sorts for the herbarium, to supplement with actual plant material the notes and pictures.

Nursery stock was shipped to a number of persons throughout the territory who had requested seedlings and who for the most part promised reports on the success of their plantations. Additional specimens were sent to Dr. Hartley in Washington for comments on rusts and on effects of chemicals used in weeding.

Wakeley and Hoffman set up germination tests of 5,200 seeds in the New Orleans office, and sent a great number of other samples, mostly of stored seed, to various universities whose faculties have heretofore helped the Station with seed testing. It is felt that the Station tests are on a better basis now than ever before, through the use of a great number of small samples instead of a few large ones less capable of statistical manipulation, but to date the tests have suffered somewhat from lack of adequate temperature control.

Early in February Gemmer and Wakeley planted 400 two-year old longleaf pine seedlings in a fenced plot on the Choctawhatchee Division of the Florida. Half were planted in heavy oak brush, and half in openings which are to be trenched to cut off all oak roots entering the openings. Longleaf seed spots were established in both brush and openings at the same time, and a number of detailed root maps were made. Twelve-inch longleaf seed-trees, each with a total crown width of twenty feet, were found to have roots extending thirty and thirty-five feet from the trunk. If more planting is to be done another year, it should be begun earlier in the season to avoid the loss of seedlings through moving them after new growth has commenced.

In the middle of February Wakeley established a test of zinc sulphate weeding on a commercial scale in a longleaf pine seed bed of the Great Southern Lumber Company at Bogalusa, using eight grams of commercial zinc sulphate per square foot of bed. At the same time he began the systematic collection of nursery weeds, and also noted the development of cypress and hardwood seedlings in the Company's beds.

Protection, Others

Grazing. Pessin spent the greater part of his office time completing a revision of Hadley's report on longleaf seedling mortality in the burned and unburned pastures at McNeill. Pessin and Wakeley completed the quadrat counts on the burned half in January, just in time for the Coastal Plain Station to make the annual burn. During February Pessin and Hoffman made a good start on the counts on the unburned half.

-------#-------

CALIFORNIA FOREST EXPERIMENT STATION

General

The annual District Investigative Report was given its final review and dressing up. This annual report continues to grow in complexity

in spite of an honest effort to keep it within reasonable bounds. No one can blame the clerical force's thrill of joy when this task, bound and covered, is finally on its way to Washington.

The quiet of the Station's quarters frequently lures distracted administrative officers from San Francisco. The most recent of such visitors was the Board of Fire Review, which spent ten days with us in deliberation and report writing.

Kotok appeared before the city council of Berkeley on request for advice on fire protection in the Contra Costa Hills.

He also attended a meeting of the California Forestry Committee which considered the forestry bills introduced at the California legislature.

Methods of Cutting Studies

Dunning's manuscript on "Tree Classes as an Aid to Timber Marking" is practically completed.

Siggins and two assistants have been helping Dunning in the compilation work for his manuscript on methods of cutting.

Wieslander spent most of the month on the California type map. Each of the National Forests have promised to recheck and revise their present type maps. Wieslander has been able to assist the Lassen and the Modoc in this job, covering considerable private holdings and areas adjacent to the National Forests, data for which were secured by the Station from other sources.

Southern California

Torrential rains reported by newspapers were not exaggerated. The watersheds burned in the last few years were washed and gullied more seriously than any noted in the last fifteen years. Mountain roads suffered particularly and for three days it was impossible to reach the Devil's Canyon Substation. Fortunately the recently prepared seed and transplant beds did not wash as badly as was first expected. The storm has delayed nursery work.

Fire Studies

Material for the statistical study of fires from 1921 to 1925, included in the individual fire reports, is now being assembled in the office.

-------#-------

PACIFIC NORTHWEST FOREST EXPERIMENT STATION

The Advisory Council met February 9 with about the same attendance as last year. The session was held at the University Club, Portland. The past year's work of the Station was reviewed by Munger and McArdle, and other agencies also explained what they were doing in the field of forest research. Much interest was expressed in fire studies and the Council volunteered to give specific advice on the conduct of this line of work as called upon. The uncompleted projects were all approved for continuance and in addition some new projects were recommended, particularly in the yellow pine region. A mid-summer field meeting at Wind River was favored. Minutes of this meeting have been mimeographed and a copy sent all Stations.

A scheme for keeping phenological observations has been drafted, after going over considerable literature on the subject and conferring with various people, which it is thought is workable and will give valuable results in the course of a few years. It implies recording about 13 seasonal events on all the conifers found at any station and similar records for the associated deciduous trees, shrubs, and herbaceous plants. This scheme will be tried in a small way at a few stations in this District this year, and it is hoped that it may be adopted by some of our cooperators and by our neighbors north and south so that the phenology of our important species for the whole coast may be known.

McArdle, with the help of Van Meter, drafted all the charts to be used in illustrating the forthcoming bulletin on Douglas fir. Necessary summaries and descriptions of basic data were compiled, and a good start made in writing the description of methods used in making the yield tables. At odd moments McArdle has been working on a proposed outline of fire studies which will attempt to sketch the needed studies and the inter-relation of these studies, all of which is a necessary prerequisite to efficient organization of the fire studies work.

What is the inflammability point of a material in terms of moisture content? It has been defined as the greatest percentage of moisture a fuel may contain and yet ignite at the touch of a spark without further drying. This is not an entirely satisfactory definition. Moreover, it seems to be impossible to bring a spark in contact with the fuel without a certain amount of drying if there is any moisture at all present. Another problem is to devise a "standard" spark. In determining the inflammability points of forest fuels what Simson proposes is partially, at least, to solve the "standard" spark problem by using the spark from a one-inch spark coil. A half-inch spark gap will be used, the gap will be held against the fuel and the current turned on for one second.

With the exception of two days spent examining seed catchers, Isaac devoted the entire month to working up field notes of natural reproduction studies and kite tests of seed dissemination completed in January. The seed dissemination tests, releasing seed from a kite over snow fields, gave interesting and somewhat unexpected results. Douglas fir, noble fir, western white pine, western yellow pine, western red cedar, and western hemlock were used in the study. In a combined test, using all species,

western white pine carried off the honors, traveling a maximum distance of 2,500 feet in an 8-mile wind. In the individual tests the laurels went to western hemlock, traveling 4,000 feet in a wind of 12 miles per hour. In each case Douglas fir was a close second. The highest wind at which Douglas fir was released was 23 miles an hour. In this test the seed started falling at 300 feet, the maximum density of fall occurred at 1,600 feet, and the extreme distance at which seeds were found was 3,500 feet out from point of release. The lightest wind at which Douglas fir seed was released was 6 miles an hour. In this test the seed fall began at 150 feet from point of release, reached maximum density at 1,000 feet out, and extreme distance at 1,800 feet out. In all of the tests the seed was released at a 200-foot elevation over level fields and the wind velocity was taken 7 feet above the surface at time of release. The general law of distribution established by the tests showed that the greatest density of seed fall occurred about half way out and at this point the per cent of sound seed was normal for the lot. Interesting points brought out by the test were as follows:

1. Variation in seed of same species caused distribution over wide range under same wind velocity and height of release.

2. Comparatively little seed fell within 200 feet even in the lightest winds.

3. Seed was distributed in a narrow path, the average width of which was 35 feet.

4. The comparatively heavy seed of western white pine and the very light seed of western hemlock made the greatest and almost equal distance flights, indicating that weight was not the controlling factor.

5. In general, the distance of distribution was found to be greater than was commonly believed.

Where the findings of these tests can be applied to cutting areas it should be possible to leave seed trees or strips of green timber so as to afford greater freedom from logging and slash fire injury without sacrificing satisfactory distribution of seed on the area.

The local press has shown a surprising eagerness to write up this experiment and good illustrated stories based on interviews were in two of the Portland Sunday papers; besides, the Associated Press made a news item of it.

Continuation of Meyer's work in the analysis of the effect of under and overstocking, although not yet completed, is bringing out some interesting results. Three sets of material are being treated, the first consisting of 179 sample acres taken in strip surveys of stands inclusive of all minor irregularities and holes, the second, of 433 temporary sample

plots chosen from McArdle's study distributed as well as possible from all age and site classes, the third, an elaboration of the second, consisting of 118 plots in the 70-year age class of all sites. All values were expressed in terms of normal yield table values to bring them on a comparable basis. Strip surveys besides lowering the average values for a stand also produce smaller stands and deviations for these values, and hence more reliable averages. Total number of trees fails badly as an index of stocking, while total basal area if the most reliable,,giving in most cases significant relations. In the case of Scribner volume, however, the percentage of normal number of trees 12 inches and up in diameter is equally if not more reliable as a measure of normality. Effect of site and slope are still to be investigated, but the indications are that more plots will have to be made use of before anything definite can be determined.

Of particular interest to fire studies men is a note, just received from J. L. Alexander of the British Columbia Forest Branch, describing a unique anemometer. This instrument, known as the Dines Patent Pressure Portable Anemometer, is of British manufacture and we do not know yet if it can be obtained in this country. Briefly, the instrument resembles an ordinary thermometer; the wind is allowed to blow into a small nozzle at one side and the pressure forces a column of colored liquid up the graduated glass tube on which the velocity of the wind in miles per hour is read directly, something like a tire pressure gauge. Does anybody know anything about it?

-------#-------

NORTHERN ROCKY MOUNTAIN FOREST EXPERIMENT STATION

Gisborne compiled weather records and coded lightning storm reports for 1926. The District Office furnished two assistants to help in this work. There is now an unbroken meteorological record for 15 years at the Priest River Station and for 18 years at Savenac Nursery. Both stations are more typical of forest weather and climate than are any of the local Weather Bureau stations, such as Spokane and Missoula. The present compilation is being made to distinguish 10-day periods corresponding to those used in the fire reports, so that the normal conditions may be known in advance and so that current weather may be compared to normal as each season advances. Such a knowledge and comparison is expected to improve the action taken in presuppression and to permit more dependably judging the efficiency of fire suppression work.

Wahlenberg is making good progress in his effort to put all his material into reports this winter. One deals with the influence of size of seed of yellow pine on behavior of planting stock. The results of the study indicate recognizable influences within the first two or three years of the plant's life, but apparently little thereafter. Differences in development also are greater for seedling than for transplant stock. Average stem measurements of 1-0 plants were as follows:

Size of seed	Length in.	Diameter mm.
Large	3.01	2.05
Medium large	2.87	1.88
Medium small	2.56	1.76
Dwarfs	2.55	1.70
Midgets	2.10	1.57

Survival of 2-0 plants five years after field planting was as follows in order of the large to midget size seed: 46, 39, 38, 29, and 31 per cent. Although size of seed in itself seems to have little effect on the later development of the field-planted stock, grading of seed would seem worth while in this region for the purpose of getting better survival.

Haig reports from Washington that satisfactory progress is being made on the computation work of the white pine yield study. All efforts, however, are still confined to compiling the six second-growth volume tables necessary before the yield computations proper can be undertaken.

-------#-------

ROCKY MOUNTAIN FOREST EXPERIMENT STATION

The winter has been extremely open and comparatively mild, and it begins to look like our plantations will show heavy winter loss at the spring count. Heavy loss has already been experienced in the older ornamental plantings of lodgepole and limber pine on the administrative area, due partly perhaps to a severe, early fall frost, which was responsible for some nursery loss, but especially to critical drying out of the ground in the fall before freezing-up occurred.

Such of Roeser's time during the rest of the month which was not given to work of routine and administrative nature was spent almost entirely in curving and tabulating individual tree measurements of lodgepole for use in constructing a series of general taper curves for this District. Approximately 1,500 of these have now been worked up with some 1,200 still to be tackled. It is expected that this study will occupy most of his time in March.

Bates spent the entire month in Washington on the Wagon Wheel Gap streamflow report which he is working up with Professor Henry of the Weather Bureau. Progress has been slower than was figured upon, but the end of the month practically saw completion of the work and Bates expects to return to Colorado Springs about March 8.

Fifty-eight copies of "A National Program of Forest Research" were mailed to interested citizens during the month. In our letter of transmittal an invitation was extended to these people to visit the station on

Mt. Manitou, and to date over one-third have answered, stating that the invitation will be accepted at the earliest possible opportunity. In this way we are stimulating the interest of our prominent citizenry whose attention in the past has been rather slack.

-------#-------

MANUSCRIPTS RECEIVED

SOUTHERN

"Volume, Yield, and Stand Tables for Second-Growth Southern Pines." R. D. Forbes.

NORTHERN ROCKY MOUNTAIN

"Effect of Ceanothus Brush on Western Yellow Pine Plantations." W. G. Wahlenberg. (J.A.R.)

"Meteorological High Lights of the Quartz Creek Forest Fire." H. T. Gisborne. (For Mo. Wea. Rev.)

"Influence of Size of Western Yellow Pine Seeds on the Behavior of Forest Planting Material." W. G. Wahlenberg. (J.A.R.)

PACIFIC NORTHWEST

"Note on an Unusual Well." A. G. Simson. (Mo. Wea. Rev.)

"A Working Plan for the Determination of the Inflammability Points of Certain Forest Fuels." A. E. Simson.

"Rates of Growth of Second Growth Douglas Fir as Shown by Periodic Re-Measurements on Permanent Sample Plots." Walter H. Meyer. (For J. A. R.)

"Effect of Forest Cover in Intercepting Summer Rainfall." (Working Plan) A. G. Simson.

"Forest Research in the Ryderwood Region for 'Longview Daily News'." T. T. Munger. (Annual edition.)

"An Analysis of Smoking Hazard." (Final Report) A. G. Simson

"The Lumbering Industry Discovers Relative Humidity." A. G. Simson. (For Tycos, Rochester)

"Shall I Take Up Forest Research?" (In Oregon Cruise). W. H. Meyer.

"Rates of Growth of Second Growth Douglas Fir as Shown by Periodic Measurements on Permanent Sample Plots." (For J. A. R.) W. H. Meyer.

SOUTHWESTERN

"Grazing and Reforestation." G. A. Pearson. (To Jour. For.)

APPALACHIAN

"Pulpwood Prospects in the Southern Appalachians." E. H. Frothingham. Address before Woodlands Section, American Paper and Pulp Association, New York, February 23, 1927.

IN PRINT

Bates, C. G. "Better Seeds, Better Trees." Journal of Forestry, February, 1927.

" " " "Review of Soil Temperature as Influenced by Forest Cover, by Tsi-Tung Li."

Dana, S. T. "European Forest Experiment Stations." Yale Forest School News, January, 1927.

Gervorkiantz, S.R. "A New Growth Per Cent Formula." Journal of Forestry, January, 1927.

Hanzlik, E. J. "The Balsam Firs (genus Abies)." Four L Lumber News, January, 1927.

Kellogg, L. F. "The Natural Occurrence of Engelmann Spruce in California." Journal of Forestry, January, 1927.

Krauch, Hermann. "Comments on Bates' Review of 'Determination of Increment in Cutover Stands of Western Yellow Pine in Arizona'." Jour. Agr. Res., v. 32, no. 6, March 15, 1926.

Marshall, Robt. "Volume Production in Forestry Literature." Journal of Forestry, February, 1927.

Marshall, G. E. "Slash Disposal in Northern Michigan." American Lumberman, January 29, 1927.

Wackerman, A. E. "Selective Logging - What It Means to the Mining Industry." Prepared for Lake Superior Mining Inst. 25th Annual Meeting. Gogebic Range, September 8 and 9, 1926.

-------#-------

FOREST PRODUCTS - DISTRICT 1

Lumber Census

Very good cooperation is being obtained from the Idaho and Montana mills in connection with the 1926 canvass. The first request to the South Idaho mill operators was mailed by District 4 on January 11 and their second call was made on February 3. The first requests to all mills in North Idaho and Montana were mailed on February 1.

The following figures indicate the status of the work on February 28:

	Montana	Idaho	Both States
Total Mailing List (First Request)	263	327	590
Total Returns	139	207	346
Number of Delinquents	124	120	244
Percentage of Returns Received	52.8	63.3	58.6

The returns have been edited and information from the completed schedules is now being tabulated.

Lumber Prices and Movement

Av. Mill-run Prices	Annual 1925	First Q. 1926	Second Q. 1926	Third Q. 1926	4th Q. 1926
Idaho White Pine	$37.37	$37.10	$38.65	$37.47	$37.95
Pondosa Pine	28.02	29.33	28.14	24.87	24.62
Larch-Fir	19.33	19.33	18.05	17.40	17.15
White Fir	20.14	19.79	19.86	18.60	17.56
Spruce	24.38	23.60	25.68	22.58	23.51

	January, 1926	January, 1927
Cut	81,421 M	69,293 M
Shipments	118,141 M	114,888 M

Lumber Cut by Species

Year	No. of Mills	Idaho Wh. Pine	Pondosa Pine	Larch & Fir	Other Woods	Total
1922	47	267,277	752,186	329,977	64,042	1,413,482
1923	46	293,266	922,187	430,955	70,792	1,717,200
1924	45	294,172	854,428	366,883	64,855	1,580,338
1925	45	301,979	1,096,278	386,229	98,180	1,882,666
1926	49	252,821	1,114,932	285,315	75,977	1,729,045

Miscellaneous

The field work on the moisture-content study was started during the month and will be continued during March by Mr. French of the Laboratory and Mr. Bradner of this office.

The preparation of the bulletin, "Air Seasoning of Western Softwood Lumber," has been going forward and this will be completed during March.

---#---

FOREST PRODUCTS - DISTRICT 5

Identification

During the month a number of samples obtained from siding and other portions of buildings which have shown unusual length of service in the Sierra-Nevada region of the State were identified for the California White & Sugar Pine Manufacturers Association. About equal numbers of the samples (these from siding) proved to be sugar pine and western yellow pine, respectively. About half as many as of these species were Douglas fir. There were no samples of white fir.

Moisture Content

Mr. French from the Laboratory arrived in the early part of the month, and accompanied Mr. Brundage for about two weeks in the work of collecting samples on this project. Their reception by the mills was uniformly cordial and the work is being carried out successfully and rapidly.

Air Seasoning

Two very interesting developments have occurred in respect to supplying the need for economical and effective weed killers suitable to application in lumber yards in keeping them free from weed and grass growth. One product recently put on the market here is called the K.M.G. weed killer manufactured by the Weed Control Company, Berkeley, California. Another is the Atlas weed killer manufactured by the Chipman Chemical Engineering Company, Palo Alto, California, (and New York City). The merit of both is that they kill completely the whole plant, roots and all, and thus prevent return growth of such weeds as morning-glory, sorrel, dock, dandelion, etc., which occurs with considerable certainty after the application of most chemicals. The chief drawbacks of the K.M.G. are that it is poisonous to animals and that it will injure clothing and hands if spilled upon them in handling it. In respect to the former point, however, its manufacturers claim that its odor is repellent to animals so that they will not readily eat foliage treated with it. Of the Atlas preparations there are two forms - Atlas A., which is also poisonous, but has been

widely used by railroads, and Atlas N.P. (non poisonous). The latter is supposed to be somewhat less effective than the former, but experiments by the Office of Blister Rust Control in the eradication of Ribes have shown such extremely favorable results during the last season that it is felt worth trial for lumber yard application. Arrangements have been made by this office for comparative tests in the yards of the Madera Sugar Pine Company and the Sugar Pine Lumber Company.

Marine Piling

Mr. Hill is receiving much appreciated help in the time-consuming work connected with getting the marine piling report through the press, from the chemist of the Treating Plant Office of the Southern Pacific.

Distillation

The office is keeping in touch with an apparently very remarkable accomplishment in the commercial development of the steam-distilled oil of California laurel. This oil has been found by previous investigators to yield about 30% of Cineol but the remaining 70% is so heavily contaminated with the exceedingly irritating and refractory substance, Umbellulone, as to have been considered worthless. Dr. John A. Prentice, a local chemical engineer, has succeeded in completely breaking down this substance with the aid of metallic catalyzers, and producing from it Thymohmenthol and other products. The interesting point is that he claims to be able to obtain these products complete at a cost less than that of the Cymene which is the raw material for their synthetic production.

Pulp and Paper

A most interesting project has arisen at the Sugar Pine Lumber Company, looking toward the utilization of sawmill waste by the manufacture of insulating lumber by the use of the semi-chemical pulping process developed at the Forest Products Laboratory. The project was promoted by the Coe Manufacturing Company, whose interest was, of course, in the use of their dryers in the preparation of the product. In view of the inadequate foundation of experimental results in respect to the application of the semi-chemical process to coniferous woods, this office is endeavoring to interest the lumber company and the Coe Manufacturing Company in joint cooperative experimental work with the Laboratory in developing this application.

Pencil Woods

In connection with a change of managers at the Hudson Lumber Company, which is a subsidiary of the Eagle Pencil Company, Mr. E. M. Berolzheimer, president of the pencil company, has been in California and has expressed a keen interest in developing the merits and usefulness of western juniper as compared with incense cedar for pencil manufacture. Cooperative activity is being given this matter by Products with the Office of Forest Management.

Lumber Census

The difficulties surrounding the cooperative reimbursement of Forest Service expenditures on the census work appear to have been sufficiently cleared so that the canvass for the 1926 census was started during the month. Junior Forester John M. Sammi is assisting for about a month.

Lumber Prices

Through a newsnote appearing in The Timberman an old ledger giving prices of lumber products over a period around the year 1875 has been obtained by this office from the Oakland Planing Mill Company and sent to the Forester's office.

Government Cooperation

Request has been received from the National Committee on Wood Utilization, referred by the California White and Sugar Pine Manufacturers Association, for information in respect to air seasoning practices in this region. They were referred to the published reports of our air seasoning study. Assistance was also requested in person and given to Mr. Monahan of the Department of Commerce in an investigation in this region of the uses of sawdust.

Miscellaneous and Administrative

The annual report of the office was revised in accordance with action by the District Investigative Committee for final issue.

-------#-------

FOREST PRODUCTS - DISTRICT 6

General Survey of Woods Waste in the Douglas Fir Region

In addition to the waste material left on the ground in the form of slash, given in last month's report, the data show that 1,817 board feet of sound material per acre was left in excessively high stumps. The smallest amount of waste in this form found on a single acre was 44 board feet, the largest 6,669 feet; the smallest amount per acre for a single company was 808 feet, the largest 3,995 feet.

Mr. Gibbons attended the second annual meeting of the Pacific Northwest Advisory Council, giving a brief statement of the object and results of the General Survey of Woods Waste in the Douglas Fir Region.

Lumber Census

The taking of the 1926 lumber census was started during the month,

1,655 "first request" schedules being mailed out. To date 410 schedules have been returned, of which 350 have been edited.

Cold-Seasoning Study

The curves show that after the first 30 days (July 24 to August 24) very little drying occurred; in fact, at the end of this period the moisture content was 1.5 per cent lower than at the end of the study (116 days), and only 1.2 per cent higher than at the lowest point reached (September 28).

The degrade, confined entirely to the "B and Better" stock amounted to 17.57 per cent, which was about equally divided between sap stain and season check losses, or 9.36 per cent and 8.21 per cent, respectively.

Pulp and Paper

It has been previously mentioned that the pulp and paper industry on the Pacific Coast seems to be entering on a new state of development. The capacities of the old plants are being increased; new plants are being built; and additional capacity is being promoted. As shown by the following table, the daily pulp capacity on the Coast amounted to nearly 2,500 tons at the close of 1926. Since that time 1,060 tons are being installed: Oregon 100 tons, Washington 610 tons, and British Columbia 350 tons. The above does not take into account several developments that seem assured.

Rated Capacity of Pulp and Paper Mills on the Pacific Coast[1]
(Tons per day)

Political Division	Pulp				Paper			
	Mechanical	Sulphite	Soda	Sulphate	News	Wrapping	Book	Bound
California	20	30	..	..	..	90[2]	..	..
Oregon	537	270	..	..	325	210[2]	..	..
Washington	380	335	32	..	295	175[2]	57	120
British Columbia	370	400	95	..	500	..	..	..

[1]Plants that produce both pulp and paper, based on Lockwood's Directory of Paper and Allied Trades, 1926.

[2]Includes some tissue and bond.

Publications

"Re-logging for Pulpwood in the Douglas Fir Region," by A. H. Hodgson, and "Improving Timber Bucking Technique," by A. M. Koroleff, appeared in the February, 1927 issue of The Timberman.

Department Bulletin No. 1437, "Red Alder of the Pacific Northwest," by Messrs. Johnson, Hanzlik, and Gibbons, was published in full in the December, 1926, and January, 1927 issues of The Timberman.

Six hundred reprints of the report, "The Air-Seasoning of Lumber in the Douglas Fir Region," were received from The Timberman, of which the bulk was distributed.

-------#-------

GRAZING RESEARCH

WASHINGTON

Manuscripts

Mr. Chapline attended the conference to consider the preliminary material for inclusion in the Inter-Departmental bulletin on Angora goats and mohair. It is hoped to organize this material in final form in the next few months.

Manuscripts considered during the month include Mr. McGinnies' "The Use of the Quadrat in Range Management Research" and "The Check Plot Method for Determining Proper Degree of Utilization," both of which are designed for publication in Ecology or the Journal of Forestry; Mr. Schoeller's "The Cost of a Calf in Southern New Mexico," for the Producer; and Mr. Forsling's "The Development of Better Grazing Practices," also for the Producer. A manuscript was also received from Mr. C. S. Robinson, "Notes on the Habits and Forage Requirements of Deer in the Sequoia National Forest."

Cooperative Tests of Sweet Clover

The Secretary of Agriculture, on one of his trips, noticed sweet clover growing apparently wild in some of the valleys of Colorado. He accordingly has become interested in the question whether its usefulness for artificial reseeding of natural forest ranges can be extended. He has taken the matter up with the Office of Forage Crops of the Bureau of Plant Industry, and tentative plans have been drawn for cooperative tests at the Great Basin Experiment Station, and possibly also on some of the Forests of Colorado. It is proposed that the Bureau of Plant Industry will furnish the seed and the Forest Service will make the tests.

Forage Investigations

The most time-consuming job of February was the preparation of the three botanical portions of the 1927 Junior Range Examiner examination, and the committee conferences which followed. It is hoped that we have an examination this year that won't flunk all the applicants and yet will maintain a high professional standing.

Eight collections, representing 330 plant specimens, were submitted to the Bureau of Plant Industry for formal determination during the month, while eleven collections were reported to the field, with 150 economic-notes prints. Three hundred specimens were mounted during the month and about the same number were labeled; about one hundred specimens were filed in the herbarium.

A new genus, species, and variety for Utah

Supervisor Orange A. Olsen's recently identified plant specimen no. O-80, RG no. 52160, from the La Sal National Forest, marks the first

record of the occurrence of the genus Verbesina and of Verbesina encelioides exauriculata (=Ximenesia exauriculata) in the State of Utah. The genus (and, of course, the species and variety) are not in Mr. Tidestrom's Flora of Utah and Nevada.

Extension of Range for Violet Wheatgrass

Through the courtesy of Supervisor Macduff of the Cascade National Forest the Cascade herbarium duplicate (there is none in the Portland office) of Supervisor John G. Kuhns' grass specimen no. 50, RG no. 27884, Agropyron violaceum (form "A. violaceum andinum" of some authors) has recently been submitted to Washington for mounting on a U. S. Museum sheet and filing in the National Herbarium at the Smithsonian Institution. This is only the second time that violet wheatgrass has been collected in Oregon and marks a material range extension for this important forage species southward and westward.

Prof. C. Piper Smith's Lupine Monograph

Prof. C. Piper Smith, of San Diego, California, states that his monograph of American lupines is finally started, all the preliminary publication now being out of the way. Professor Smith has had a varied career, including business, teaching, and, at one time, forestry in California. He is probably our foremost American student of lupines, and Mr. Tidestrom cheerfully admits his indebtedness to Professor Smith in his identification work on our Forest Service lupines. Professor Smith has planned an extensive botanizing itinerary in the West this summer and hopes to visit one or more of the type localities of new lupines which have been collected on the National Forests.

-------#-------

JORNADA RANGE RESERVE

Range Conditions and Precipitation

Weather conditions during the past month have been particularly mild for this time of the year and although very little precipitation has fallen, there is considerable moisture in the soil due to favorable moisture conditions during January. Forage growth is well under way inso far as winter weeds are concerned and some grass growth has materialized. On the whole, range conditions in this locality are very favorable; cattle are in good shape and prospects for the immediate future are good.

Investigative Work

Compilation of data and getting out work plans together with numerous other odd and routine jobs have taken most of the time this month. A large number of the Jornada quadrat charts together with a considerable amount of other data have been shipped to Mr. Nelson at Ogden, who is using

the material in working up a manuscript in connection with the natural revegetation of grama type range.

A number of Russian mulberry cuttings have been heeled in this winter in order to secure transplants to be set out this spring for shade and wind-break purposes.

Predatory Animal Control

The two Biological Survey hunters, who have been detailed on the Jornada during the past two months as a result of the cooperative efforts of the Albuquerque Office of the Biological Survey, have completed their poisoning operations. Sixty-eight coyotes were found poisoned and it is estimated that an equal number succombed to poison that were not found.

Cattle Sales

The remainder of the 1926 Jornada calf crop was shipped the 24th of this month to go on pasture in Texas. One hundred and eight head were delivered; sale price $27.50 per head both sexes.

Federal Business Association

Schoeller attended a meeting of the local Federal Business Association, February 16.

Road Work

The County Road Supervisor of Dona Ana County, New Mexico, spent the day February 21 in the field with Schoeller making an examination of the Jornada-Las Cruces road to secure the necessary data relative to regrading and draining this road. The county has signified its willingness to cooperate in this road work to a considerable extent; operations are scheduled to begin about the middle of April.

Visitors

Assistant District Forester John D. Jones of the District 3 Office was a visitor on February 10. He delivered an excellent talk on Forestry at the Las Cruces High School during the assembly hour in the morning and showed several reels of Forest Service pictures to the High School students at a local picture house in the afternoon. This office has arranged to show several more of these pictures to the High School students at different times during the next few months.

Mr. A. E. Gray, leader of the Biological Survey work in New Mexico, was an office visitor on February 12, and spent considerable time with Schoeller going over plans concerning the Rodent Control program for the Jornada this year. Mr. Gray stated that this work would be carried through to completion during the next two years.

Messrs. A. C. Cooley of the Extension Service and Byron Hunter of the Bureau of Agricultural Economics visited the Jornada on February 2, and put in the day looking over certain of the projects and securing data on range conditions in this locality.

-------#-------

SANTA RITA RANGE RESERVE

Precipitation and Growth

During the first fifteen days of the month, precipitation over the Reserve varied from .55 inches at the lower elevations to 1.69 inches at the Florida Camp, with an average of about 1.05 for the entire area. Cool nights early in the month somewhat retarded spring growth after it had made a fair start during January. However, for the past two weeks growth has come on rapidly and considerable green grass and weeds should be available within the next ten days. With no further rains there should be above the average crop of spring feed, while additional rainfall will make an abundant supply. Stock continue in good to excellent condition all over the Reserve, many of Ruelas' stock being almost fit for market.

Poisonous Plants

Loco, which has been somewhat scarce during the past two years, bids fair to come in heavy this spring and, if at all possible, some preliminary work will be done in the way of attempting to keep off heavily infested areas by salting on parts of the range where no loco occurs. For the most part loco has been confined to Forest range adjacent to the Reserve, though it is gradually spreading into pasture No. 1, and presents a problem worthy of considerable study, for while losses in this locality have been small, with the exception of one or two years, on adjacent ranges they have been heavy almost every year that loco has occurred in abundance.

Burro Weed (Isocoma) is producing an unusually large crop of seedling growth this spring on certain parts of the range, and a rough survey is contemplated to determine what part, if any, grazing use may have played in the increase.

Personnel

Mr. Arthur J. Riggs has been appointed as a Junior Clerk on the Santa Rita, effective February 23. Mr. Riggs has had considerable experience in the Service, having worked on the Sitgreaves National Forest in various capacities for the past four years.

Visitors

On February 12, Messrs. Kerr and Taylor were visitors at the Reserve and in the absence of the Director were taken over the range by Junior Range Examiner Turner.

On February 25, Dean J. J. Thornber and Professors Vorhies and McGinnies of the University of Arizona and Dr. Walter Taylor spent the day at the Reserve. During the morning a trip was made to various enclosures while the afternoon was consumed in a discussion of plans for the coming year and in a discussion of the possibility of building a cooperative bunk house at Florida Station.

-------#-------

GRAZING RESEARCH - DISTRICT 3

The preliminary work of the re-arrangement of the District office herbarium has been recently completed. Nine hundred and forty-eight duplicate specimens were sent to the various Forests. There are on deposit in the District office herbarium 1,981 plant specimens, representing 582 genera. Nongrasslike plants lead with 1,235 specimens, representing 393 genera, followed by grasses and grasslike plants with 375 specimens, representing 69 genera, and finally trees and shrubs with 371 specimens, representing 120 genera. The total collection probably represents in the neighborhood of 1,500 species.

Unusually heavy precipitation occurred on the Forests of the Southwest during February, largely as snow. Where the fall came largely as rain the heavy rapid precipitation caused serious erosion of the soil wherever the vegetative cover had been depleted by overgrazing.

-------#-------

GRAZING RESEARCH - DISTRICT 6

The entire month of February was spent on compilation and analysis of the 1926 data on the Columbia project, "Grazing Management of Cutover Lands," review and analysis of reports on minor projects, and the preparation of data for the District Investigative Committee meeting.

Compilation unaided of the data in the 18 tabulations on plant succession, utilization, survival of coniferous regeneration, and grazing damage on this Columbia project has now been completed and has proved a task of some magnitude. Analysis of the two years data on the reproduction phases - survival loss and grazing damage - has also been made.

On this transect in 1926, 25.92 chains were heavily grazed, with an average utilization of 86.24% (based on utilization of total vegetation); 61.67 chains moderately grazed, with an average utilization of 35.08%; and 9.41 chains ungrazed. In 1925, 42 chains were grouped in the moderately grazed, 41 heavily grazed, and 5 chains ungrazed.

A total of 475 seedlings (all ages, 1919-1925) were found on this transect in the original June 1925 check. In the June 1926 check - 629 seedlings. Of these totals 340, or 71.6%, survived in 1925, and 428, or 66%, in 1926.

This sparsity of reproduction germination and survival during the two-year period on the majority of the plots was due primarily to the reburn history of the area but partly to unfavorable seed years in 1925 and 1926. This has made analysis of this reproduction phase exceedingly difficult.

The greatest loss in both years occurred in 1925 and 1926 germination and the data develops the surprising fact that losses (of all ages and species) were proportionately greater on protected than they were on grazed areas. This was especially true in 1926 and is explained by excessive losses last year of hemlock 1926 germination on the ungrazed section of the transect.

That losses from grazing do occur is indicated by comparative survival percentage figures for moderately and heavily grazed areas. The better survival of older seedlings is striking in both years, confirmatory proof of the fact that the first two years are by far the most critical in the life of the seedling, irrespective of grazing use.

In addition to comparative survival figures shown in this table - 31 seedlings, or 7.2%, of the survivals were found damaged by grazing use on this transect, these damaged seedlings being found almost entirely on bedgrounds and on railroad grades where excessive use and trampling occurred. This agrees with the results found by Kummel in his study of 1926 grazing damage on 1922 Douglas fir strip plantation along the Wind River Road. Here 200 trees, in four separate sections of the plantation extending for $2\frac{3}{4}$ miles along the road through a portion of the area grazed, were staked and examined prior to 1926 grazing use.

His October 1926 check showed that 15, or 7.5%, of the total trees staked had a portion of side branch or leader or both nipped. Nine of these (4.5%) had lost their leader - the remainder a part of their side branches only.

This damage was found where excessive bedding by the sheep occurred, none being found elsewhere on this plantation.

-------#-------